ONTARIO MINISTRY OF ENVIRONMENT
36936000023794

OPERATING SUMMARY

1974

TD
367
.A56
B45
1974
MOE

ITY OF

BELLEVILLE

WATER POLLUTION CONTROL PLANT

LABORATORY [illegible]
MINISTRY OF THE [illegible]

LIBRARY COPY
OCT 20 1975
MINISTRY OF THE
ENVIRONMENT

TD
367
.A56
B45
1974

Belleville : water pollution
control plant.

81618

Ontario

MINISTRY OF THE ENVIRONMENT

MINISTER
Honourable William G. Newman

DEPUTY MINISTER
E. Biggs

ASSISTANT DEPUTY MINISTER
REGIONAL OPERATIONS
J. Barr

REGIONAL OPERATIONS DIVISION

DIRECTOR, SOUTHEASTERN REGION
C.E. McIntyre

MANAGER, UTILITY OPERATIONS
A. Symmonds

Environment Ontario
[illegible] Library
125 [illegible]
Etobicoke, Ontario M9P 3V6
Canada

BELLEVILLE

WATER POLLUTION CONTROL PLANT

operated for

THE CITY OF BELLEVILLE

by the

MINISTRY OF THE ENVIRONMENT

1974 ANNUAL OPERATING SUMMARY

prepared by

Plant Performance Unit

TECHNICAL SERVICES BRANCH

T. Cross, Director

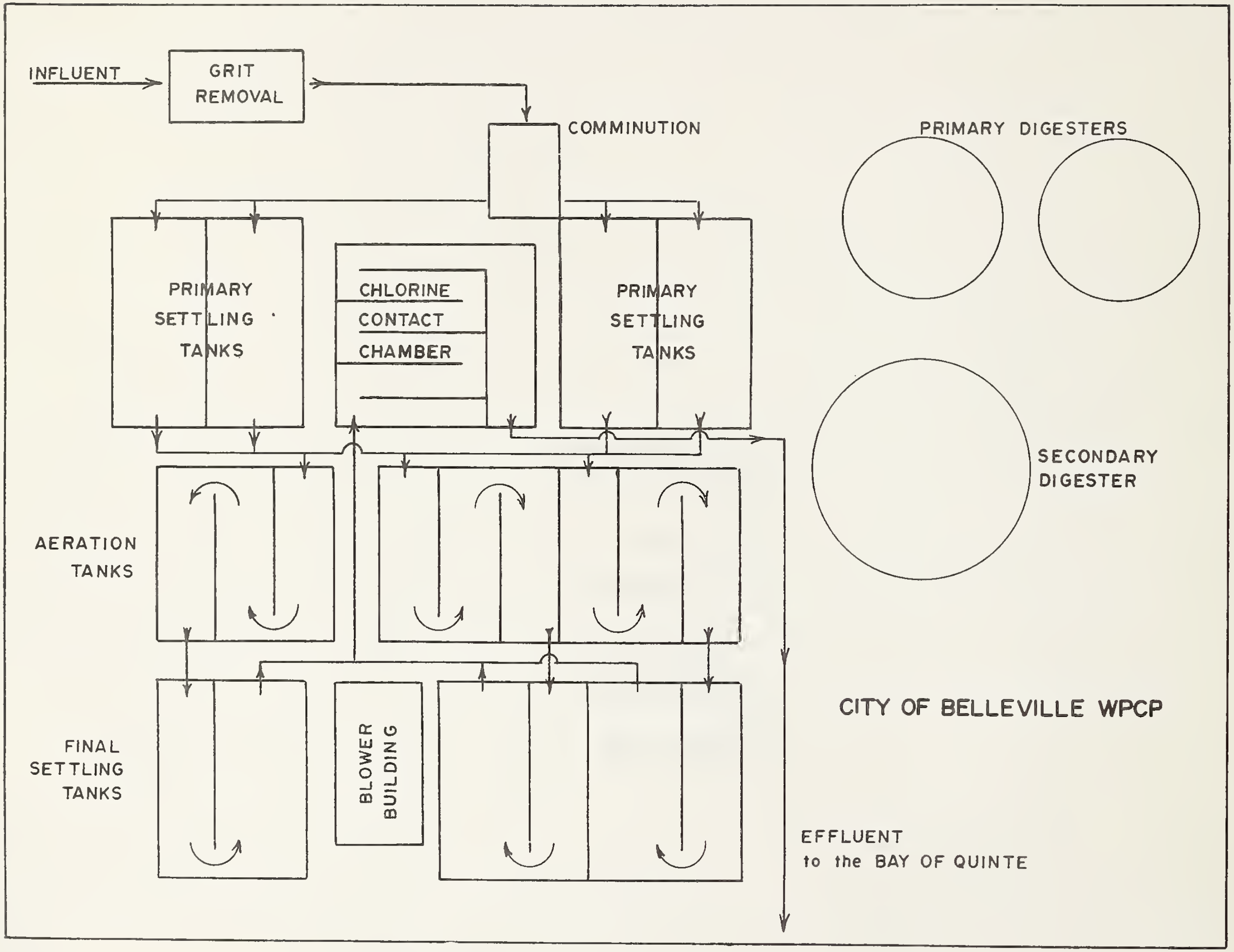
Digitized by the Internet Archive
in 2015

https://archive.org/details/bellevillewaterp23794

aseg

CONTENTS

Title Page 1
Flow Diagram 4
Design Data 5
Operating Cost 7
Process Data 9


INFLUENT
GRIT REMOVAL
COMMINUTION
PRIMARY DIGESTERS
PRIMARY SETTLING TANKS
CHLORINE CONTACT CHAMBER
PRIMARY SETTLING TANKS
SECONDARY DIGESTER
AERATION TANKS
FINAL SETTLING TANKS
BLOWER BUILDING
CITY OF BELLEVILLE WPCP
EFFLUENT to the BAY OF QUINTE

DESIGN DATA

PROJECT NO.	1-0004-66
PROJECT	City of Belleville WPCP
TREATMENT	Activated Sludge
DESIGN FLOW	8.0 mgd
DESIGN POPULATION	52,000
BOD - Raw Sewage	130 mg/l
- Removal	88%
SS - Raw Sewage	175 mg/l
- Removal	91%

PRIMARY TREATMENT

Grit Removal

Type: Aerated grit tank with grab bucket
Size: Two 24' x 24' x 12½'
(52,400 gal)
Retention: 9.4 minutes
Air Supply: Two Roots blowers 610 scfm each
Two Aerzener Rotary 350 scfm each

Screening

Type: Mechanically cleaned
Size: 2" opening

Comminution

Type: Two Chicago Pump barminutor Model C-36

Primary Sedimentation

Type: Falk
Size: Four 70' x 36' x 12'
(752,000 gal total)
Retention: 2.3 hours
Loading: Surface; 795 gal/ft^2/day
Weir; 14,700 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Three, 3-pass
each pass 60' x 20' x 12' awd
(Volume 809,000 gal total)

Retention: 2.4 hours

Air Supply

Type: Aerzen Maschinen fabric
Size: Three 2280 scfm @ 7 psi

Diffusers

Type: Sparjers - 5/16"
Spacing: 4 inch centers

Secondary Sedimentation

Type: Falk
Size: Three 83' x 56.5' x 12'
(2 pass)
(1,070,000 gal total)
Retention: 3 hours
Loading: Surface 800 gal/ft^2/day
Weir 13,000 gal/ft/day

CHLORINATION

Type: Fischer & Porter
Size: One 1,000 lb/day
One 1,500 lb/day

Chlorine Contact Chamber

Size: 54.7' x 60' x 11' (167,000 gal)
Retention: 30 minutes

Outfall

Approx. 280' of 48" dia. concrete pipe and 1179' of 36" dia. concrete pipe to Bay of Quinte

SLUDGE HANDLING

Digestion System

Type: Two stage

Primary:
Type: Gas mixed
Size: Two 45' dia. x 27' swd
(79,400 ft^3 total)

Secondary:
Type: Non mixed
Size: One 55' dia. x 27' swd
(59,400 ft^3 total)

PUMPING STATIONS

a) Plant site @ 35' tdh

One Worthington 2500 gpm (electric)
One Worthington 1666 gpm (electric)
One Worthington 2500 gpm (electric and diesel)

b) Front Street

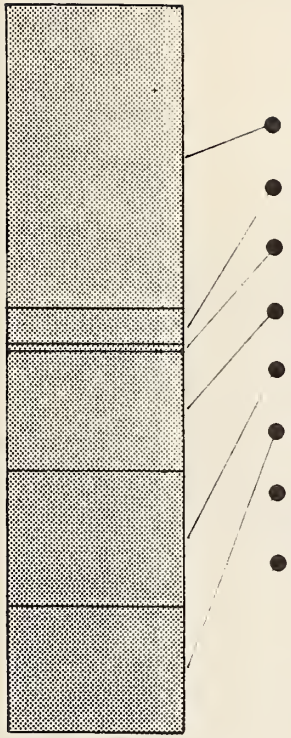
One Worthington 2500 gpm (electric @ 55' tdh)
One Worthington 1666 gpm (electric @ 55' tdh)
One Worthington 3332 gpm (diesel and electric @ 55' tdh)
One Fairbanks Morse 4400 gpm (diesel @ 42' tdh)

c) Dundas Street West

One Worthington 416 gpm (electric @ 29' tdh)
One Worthington 1300 gpm (diesel @ 40' tdh)

ANNUAL COSTS

1974 OPERATING COSTS



● SALARIES & WAGES	40	%
● EMPLOYEE BENEFITS	5	%
● TRANSPORTATION & COMMUNICATIONS	1	%
● SERVICES	17	%
● SUPPLIES & EQUIPMENT	19	%
● AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	18	%
● TRANSFER PAYMENTS	0	%
● OTHER TRANSACTIONS	0	%

YEARLY OPERATING COSTS

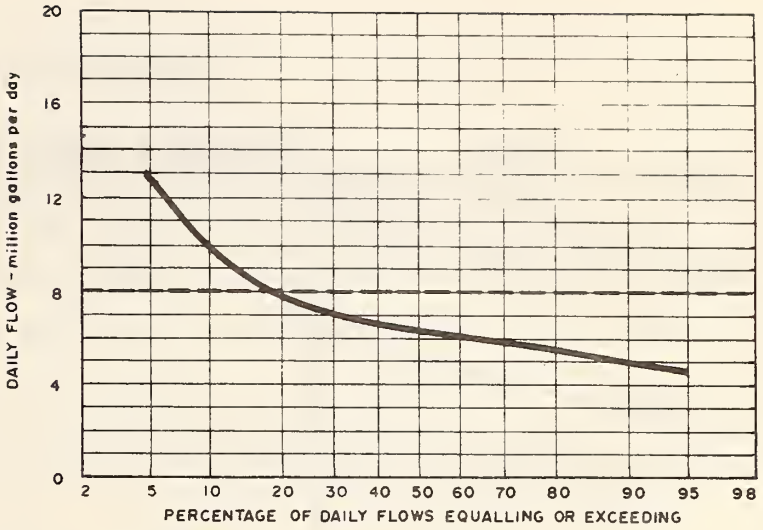
YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS	
			$/M.G.	¢/lb BOD
1974	2532	293393	116	17

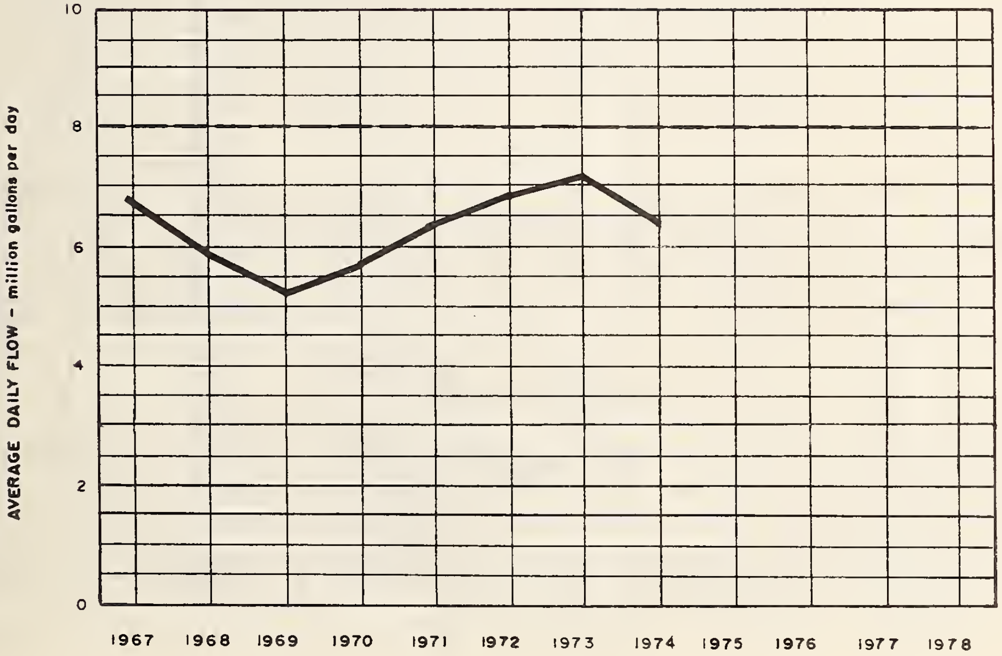
OPERATING EXPENDITURES

Regular Staff	$ 115395	$
Casual (Unclassified) Staff	2704	
TOTAL SALARIES AND WAGES		118099
TOTAL EMPLOYEE BENEFITS		13586
TOTAL TRANSPORTATION AND COMMUNICATIONS		2274
Insurance	2564	
Sludge Haulage	42839	
Repairs and Maintenance	3092	
Other Services	2299	
TOTAL SERVICES		50794
Machinery and Equipment	3281	
Chemicals	6218	
Utilities	37955	
Other Supplies and Equipment	7633	
TOTAL SUPPLIES AND EQUIPMENT		55087
TOTAL AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS		53553
TOTAL TRANSFER PAYMENTS		
OTHER TRANSACTIONS		
GRAND TOTAL	GRAND TOTAL	$ 293393

PROCESS DATA

FLOWS



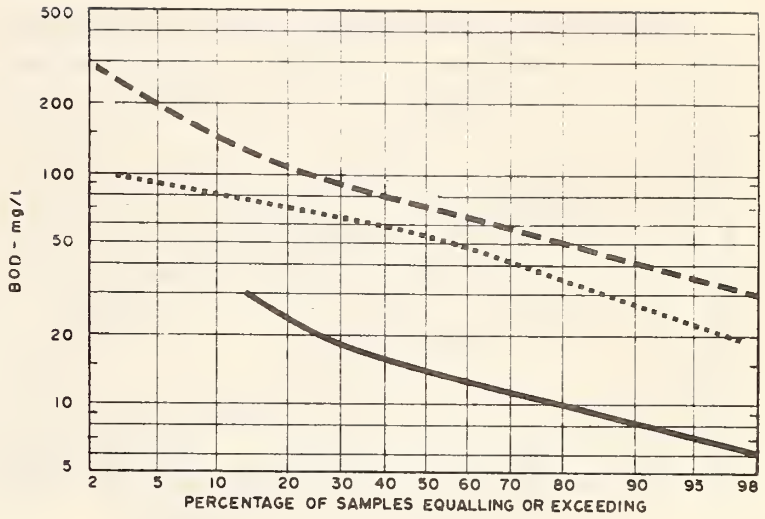


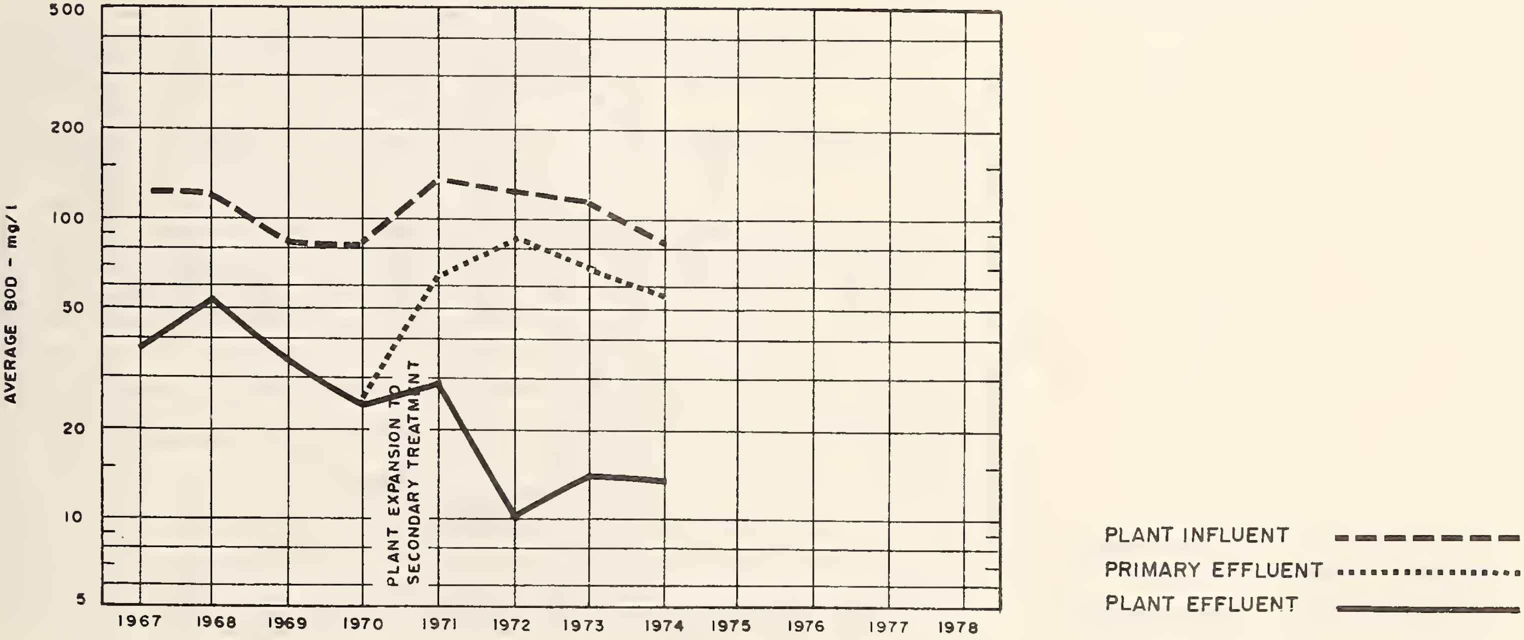
DESIGN CAPACITY — — — — — — —

PLANT PERFORMANCE

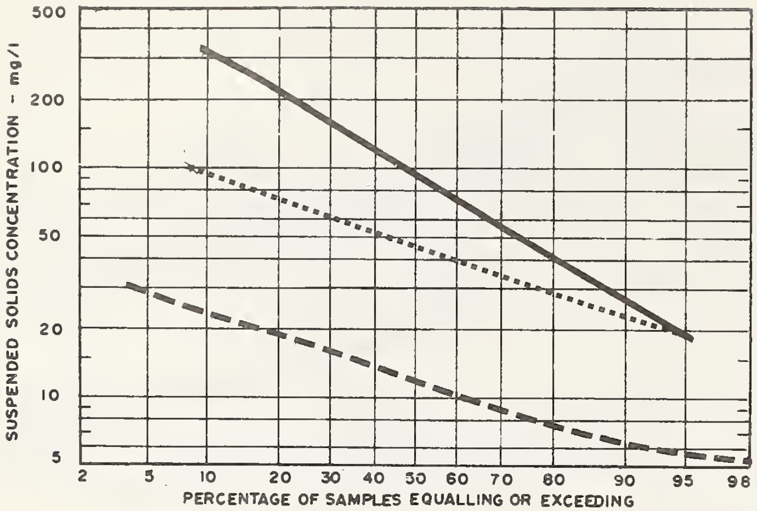
MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT
	million gallons	mil. gal	mgd	mg/l	mg/l	%	10^3 pounds	mg/l	mg/l	%	10^3 pounds	mg/l P	mg/l P
JAN	249.8	8.1	15.5	89	14	84	197	224	17	92	517		
FEB	196.7	7.0	12.7	100	10	90	177	181	11	94	334		
MAR	271.9	8.8	14.0	99	5	95	256	143	19	87	337		
APR	262.0	8.7	14.8	58	12	79	120	168	14	92	403	4.8	2.1
MAY	278.4	9.0	16.8	91	10	89	225	256	10	96	684	8.2	2.0
JUNE	187.4	6.2	9.0	82	27	27	103	100	15	85	159		
JULY	186.8	6.0	10.6	60	19	68	77	75	16	79	110	1.7	.8
AUG	168.7	5.6	6.0	55	9	84	78	39	4	90	59	.9	3.4
SEPT	158.0	5.1	6.3	102	22	78	126	126	5	96	191		
OCT	162.4	5.2	6.8	72	16	78	91	87	11	87	123	3.9	2.9
NOV	197.6	6.4	13.2	168	10	94	31	166	10	94	31		
DEC	212.1	6.8	12.8	85	11	87	157	65	11	83	114		
TOTAL	2531.8	-	-	-	-	-	1772	-	-	-	3241	-	-
AVG.		6.9	MAXIMUM 16.8	85	15	82	148	141	13	91	270	4.1	2.3
No. of Samples	-	-	-	38	38	-	-	40	80	-	-	8	6

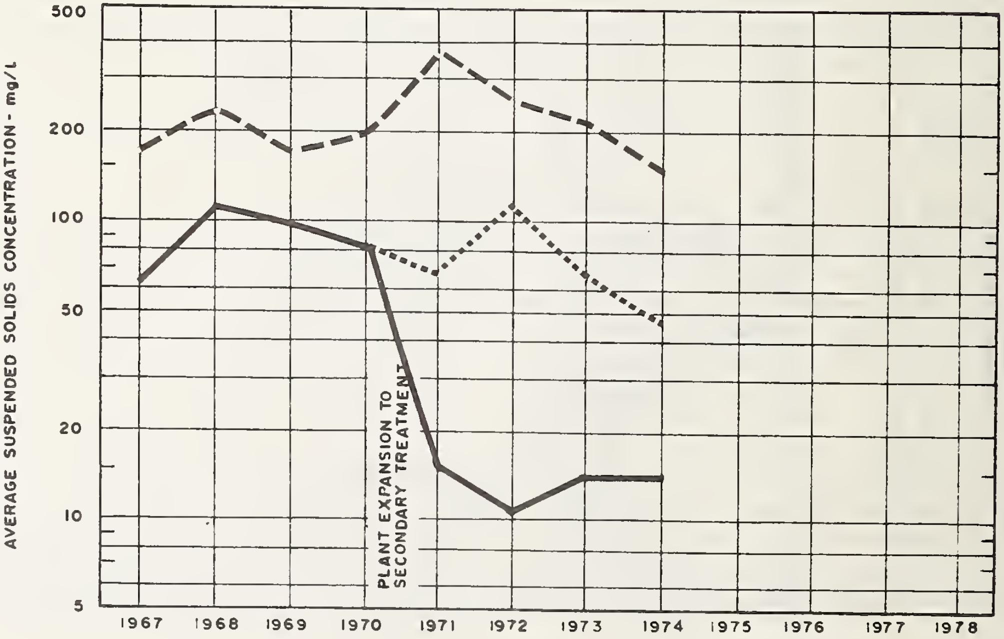
BIOCHEMICAL OXYGEN DEMAND





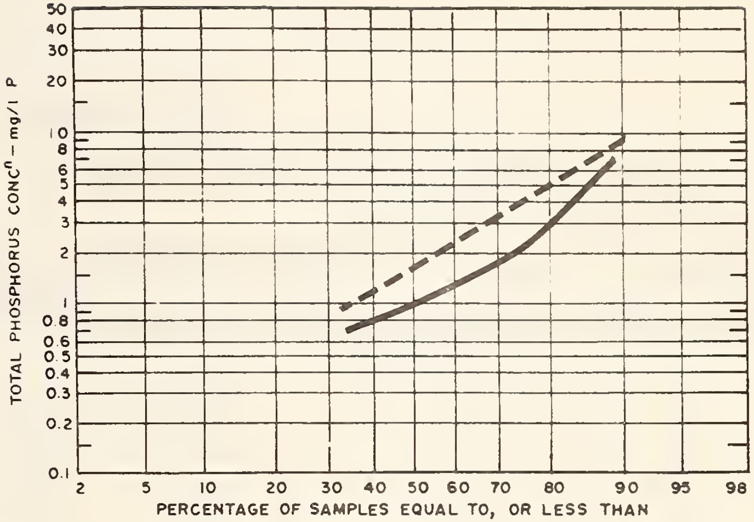
SUSPENDED SOLIDS

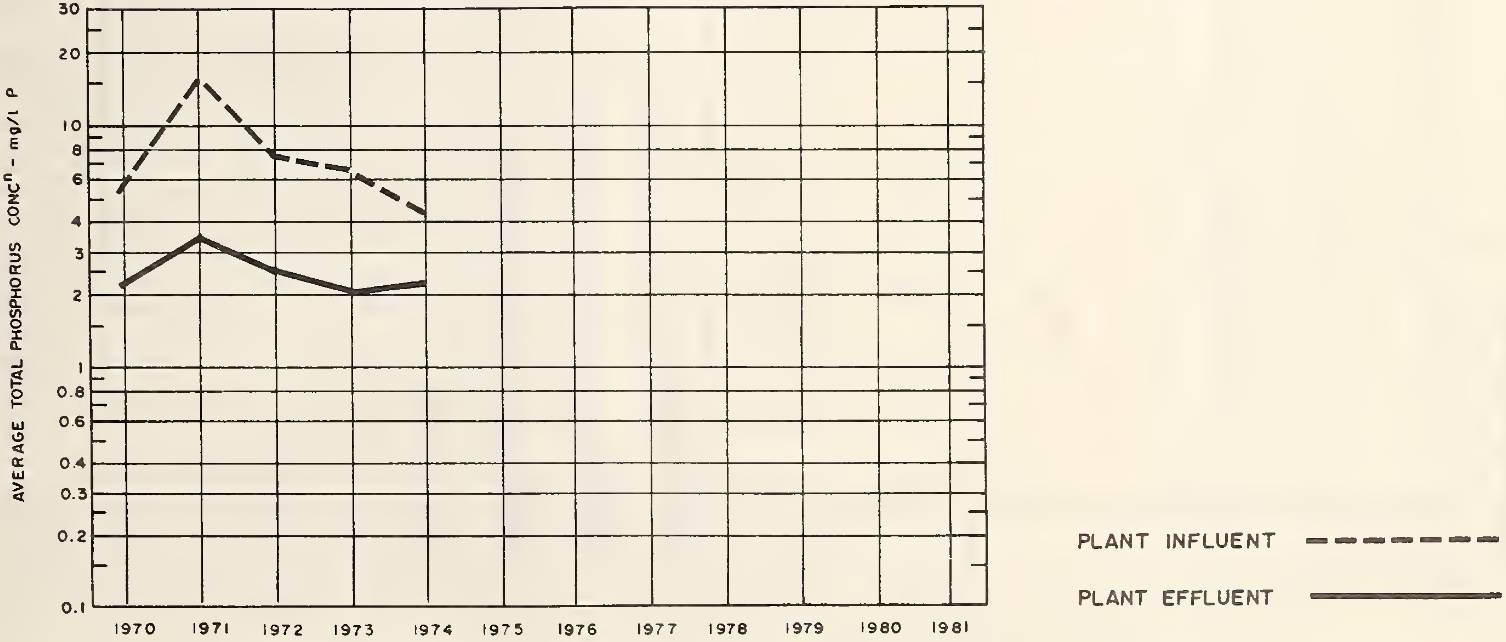




PLANT INFLUENT — — — — — —
PRIMARY EFFLUENT ················
PLANT EFFLUENT ————————

PHOSPHORUS

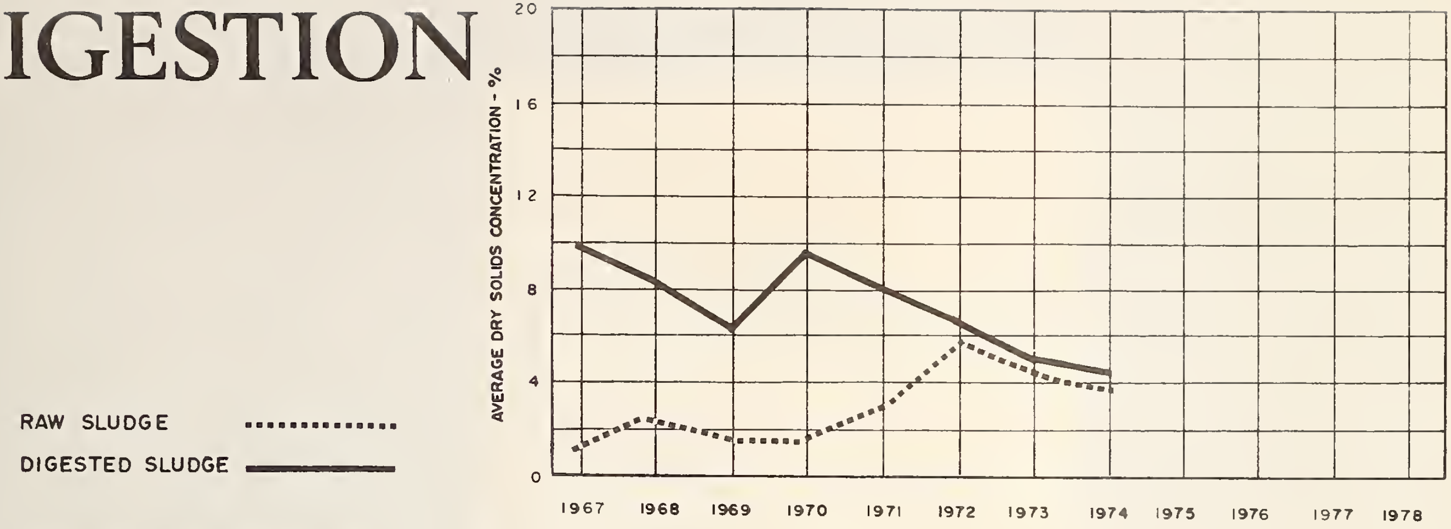

TOTAL PHOSPHORUS CONCⁿ – mg/l P
50
40
30
20
10
8
6
5
4
3
2
1
0.8
0.6
0.5
0.4
0.3
0.2
0.1
2
5
10
20
30
40
50
60
70
80
90
95
98
PERCENTAGE OF SAMPLES EQUAL TO, OR LESS THAN

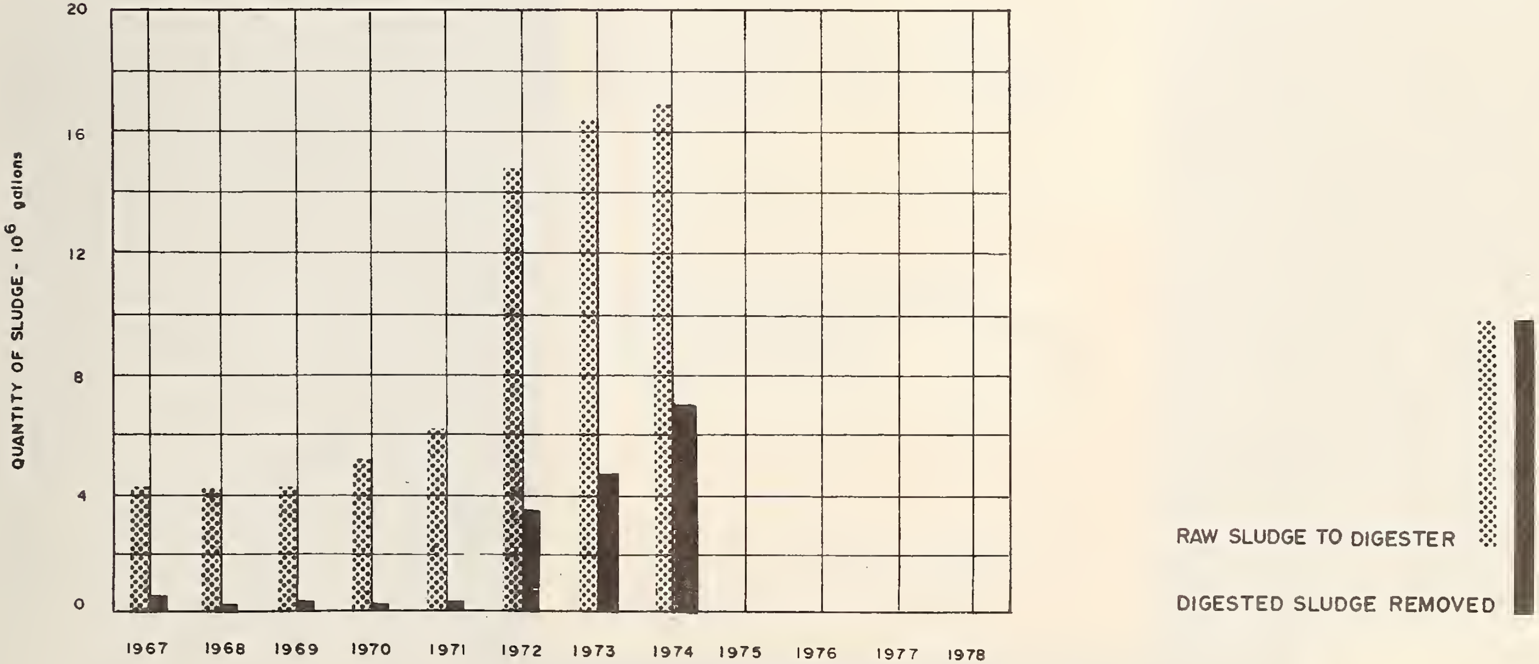

AVERAGE TOTAL PHOSPHORUS CONCⁿ - mg/l P
30
20
10
8
6
4
3
2
1
0.8
0.6
0.4
0.3
0.2
0.1
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
PLANT INFLUENT
PLANT EFFLUENT

TREATMENT DATA

	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
									RAW SLUDGE			DIGESTED SLUDGE				
MONTH	QUANTITY REMOVED cubic feet	Cl_2 USED 10^3 pounds	AVG. DOSE mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day^{-1}	AIR $\frac{1000\ ft^3}{lb\ BOD}$	QUANTITY 10^6 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	QUANTITY 10^6 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	SUPER-NATANT T. S. %	AMOUNT HAULED cubic yards
JAN	1	6.2	2.5	66	80	2900	.17	1.7	1.3	5.3	62	.28	3.6	56	3.6	1645
FEB		4.2	2.1	65	39	2700	.20	1.7	1.2	4.9	68	.49	3.5	56	3.6	2842
MAR		6.7	2.5	38	61	2200	.15	2.2	1.3	4.8	65				3.2	
APR		5.5	2.1	34	69	2200	.14	1.5	1.3	5.8	64	.10			3.6	588
MAY		5.5	2.0	53	67	2100	.23	1.5	1.3	6.1	62	.54	4.0	54	4.0	3199
JUNE		4.9	2.6	61	49	1800	.21	2.5	1.3	5.6	64	.76	3.8	54	3.6	4530
JULY	405	6.8	2.2	32	31	1700	.11	8.3	1.3	5.1	62	.91	4.1	56		5424
AUG	135	6.1	3.6	54	20	800	.03	2.6	1.4	3.1	64	.74				4410
SEPT		6.4	4.0	71	41	1000	.13	3.2	1.3	3.7	69	.60			2.0	3594
OCT		6.1	3.8	59	45	1000	.31	2.4	1.3	3.0	71	.66				3926
NOV		5.7	2.9	78	35	1400	.35	1.6	1.9	3.9	69	.57	2.8	61	2.7	3402
DEC		4.3	2.0	49	30	1600	.21	2.8	2.0	4.3	68	.86	3.0	60	3.2	5089
TOTAL	541	68.4	–	–	–	–	–	–	16.9	–	–	6.51	–	–	–	38649
AVG.	.2 cu.ft/mil gal	5.7	2.7	54	48	1800	.18	2.7	1.4	4.6	66	.54	3.5	57	3.3	3221

DIGESTION


RAW SLUDGE
DIGESTED SLUDGE
AVERAGE DRY SOLIDS CONCENTRATION - %
20
16
12
8
4
0
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978


QUANTITY OF SLUDGE - 10⁶ gallons
20
16
12
8
4
0
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
RAW SLUDGE TO DIGESTER
DIGESTED SLUDGE REMOVED

Date Due

ONTARIO WATER RESOURCES COMMISSION
DIVISION OF PLANT OPERATIONS.

BELLEVILLE SEWAGE TREATMENT PLANT.
ANNUAL REPORTS.
TD 227/B45/W38/1974/MOE
1974

DATE	ISSUED TO
May 10/95	CCIW Library.

TD227/B45/W38/1974/MOE
Ontario Ministry of the En
Belleville water
pollution control
aseg
c.1 a aa

LABORATORY & RESEARCH LIBRARY
MINISTRY OF THE ENVIRONMENT

PRINTED IN CANADA

TD
367
.A56
B45
1974

Belleville : water pollution
control plant.
81618